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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,487	12/15/2003	Robert Hong Leung Chiang	9930A	3809

7590 01/08/2007

Wall Marjama & Bilinski LLp
101 South Salina Street
Suite 400
SYRACUSE, NY 13202

EXAMINER	
ALI, MOHAMMAD M	
ART UNIT	**PAPER NUMBER**
3744	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/736,487	CHIANG ET AL.	
	Examiner	Art Unit	
	Mohammad M. Ali	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6-11, 13-14, 16 and 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reynard (5,502,979) in view of Kutscher et al. (6,378,605). Renard discloses a refrigerated display cabinet comprising an insulated (a refrigerated cabinet is inherently insulated) cabinet 50 defining a product display area/shelves 1 maintained in a refrigerated condition at a temperature above 32 degree F (refrigerated space excluding freezer space is obviously at a temperature above 32 degrees F) and having a compartment 37 separate from the product display area 1an evaporator 28 disposed in the compartment 37; at least one air circulator 29 disposed within the compartment 37 in cooperative relationship with the evaporator 28; and an air circulation circuit (23-26) connecting the product display area 1 and in direct air flow communication with the

compartment 37. Renard discloses the invention substantially as claimed as stated above. See Fig. 2. However, Renard does not disclose a relatively high airside pressure. drop evaporator. Kutscher et al. teach the use of a high airside pressure drop heat exchanger 10 with fin density ranging from 3 fins to 10 fins per inch in a heat exchanging system for the purpose of controlling pressure drop. Kutscher et al., also disclose a draw through flow by the action of a fan 12. See Fig. 1, column 12, lines 31-67. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the refrigerated display cabinet of Renard in view of Kutscher et al. such that a high air side pressure drop heat exchanger with fin density ranging from 3 to 10 fins per inch could be provided to in order to run a refrigeration system.

Claims 12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Renard in view of Kutscher et al., as applied to claims 6, 9 and 10 above, and further in view of Navarro (6,145,327). Renard in view of Kutscher et al., and discloses the invention substantially as claimed as stated above. However Renard in view of Kutscher et al. does not disclose a plurality of fans. Navarro teaches the use of a plurality of fans 16 along an evaporator coil 17 in a refrigerated case for the purpose of running a refrigeration system. See Fig. 7. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the refrigerated display cabinet of Renard in view of Kutscher et al., and further in view of Navarro such that a plurality of fans could be provided to in order to run a refrigeration system. For spacing the fan at a specific distance of 2 feet is an obvious design choice

of the individual skilled in the art since there is no criticality or unexpected result from it

Response to Arguments

Applicant's arguments filed 11/30/06 have been fully considered but they are not persuasive. The Applicant argued, "The Examiner's response to Applicants' Remarks filed 8/3/2006 with respect to the prior rejection of claims 6-11, 13-14, 16 and 18 has been considered. Applicants acknowledge that Kutscher et al. recognize that a higher fin density heat exchanger will characteristically exhibit a higher air-side pressure drop relative to a lower fin density heat exchanger. However, Applicants respectfully submit that Kutscher et al. can not be read to teach or motivate one having ordinary skill in the art to provide a relatively high air side pressure drop evaporator in the environment of a medium temperature refrigerator such as in Renard wherein the evaporator is subject to frost formation on the. fins due to the presence of moisture in the air passing from the refrigerated food storage compartment of the refrigerator and through the space between the fins of the evaporator.

Applicants' invention is directed at providing a medium temperature refi igerated merchandiser, i.e. a merchandiser having a refrigerated food display case at a temperature above 32 degreed F, having an improved air flow distribution entering the evaporator whereby the evaporator will be characterized by a relatively more uniform exit air temperature across the length of the evaporator. It is well appreciated by those of ordinary skill in the art of refrigeration that the evaporator of a medium temperature merchandiser will be subject to frost formation on the fins due to the presence of moisture in the air passing from the refrigerated food storage compartment of the

refrigerator and through the space between the fins of the evaporator. For decades, it has been conventional practice in the prior art to employ only low fin density heat exchangers as evaporators whereby the spacing between neighboring fins will be large enough to limit frost bridging the space between neighboring fins which would block air flow thereby worsening air flow maldistribution through the evaporator and adversely impacting overall evaporator performance.

Contrary to conventional wisdom, Applicants invention provides a medium temperature refrigerated merchandiser having a relatively high air side pressure drop evaporator (Claim 6). In an embodiment, the relatively high air side pressure drop evaporator may comprise a fin and tube heat exchanger having a fin density of at least 6 fins per inch (claim 9). In an embodiment, the relatively high air side pressure drop evaporator may comprise a fin and tube heat exchanger having a fin density in the range of 6-15 fins per inch (claim 10). The air flow velocity profile leaving the evaporator of a unit having a relatively high fin density will be more uniform than the air flow velocity profile leaving the evaporator of a conventional prior art unit equipped with a relatively low fin density evaporator. At the time the invention was made, the accepted practice in medium temperature refrigerated merchandiser design was to use a relatively low fin density evaporator, i.e. typically from 2 to 4 fins per inch, in view of the desire to delay frost bridging between fins as frost builds up during operation of a medium temperature refrigerated merchandiser. Applicants respectfully submit that the fact that the Examiner has not found a single reference disclosing a medium temperature refrigerated merchandiser equipped with a relatively high pressure drop evaporator of

any design to provide a more uniform air flow distribution through the evaporator as a means of alleviating excessive localized frost formation due to air flow maldistribution is strong evidence of the non-obviousness of Applicants invention and further indicates the Applicants' invention is contrary to the conventional wisdom in the art and that there is no motivation in the prior art to do so.

The general object of Kutscher et al. is to provide a gas-fluid heat exchanger having increased heat transfer per degree of temperature difference between the gas flowing over the finned tubes and the fluid passing through the tubes (UA) and improved ratio of UA to pressure drop (see colunm 3, lines58-60). Kutscher et al. teach doing so (see column 5, lines 53-58) by enhancing the heat transfer coefficients of a fin and tube heat exchanger by increasing the gas side heat transfer coefficient and minimizing the gas side pressure drop. Kutscher et al. does not at all address the issue of, or even recognize the problems attendant to, frost formation and build-up between closely spaced fins. Applicants respectfully submit that Kutscher et al. fail to do so because they did not intend their higher fin density, porous fin heat exchanger to be employed in the environment of a medium temperature refrigerated merchandiser wherein frost formation would be a performance issue.

Only Applicants teach using a relatively high air-side pressure drop evaporator in such an application to more evenly distribute air flow through the evaporator. Applicants respectfully submit that one having ordinary skill in the art would at least have been motivated, at the time the invention was made, by Kutscher et al. to select the low fin density embodiment of the heat exchanger Kutscher et al., in accord with the

conventional wisdom of desiring a low pressure drop and wide fin spacing for frosting applications. There is no teaching or motivation in Kutscher et al. that would have led one designing a medium temperature refrigerated merchandiser to go against the conventional wisdom at the time of the invention and instead select a high fin density embodiment of the heat exchanger of Kutscher et al. providing a high airside pressure drop evaporator. Accordingly, Applicants respectfully submit that one skilled in the art on the time of the invention, applying the teachings of Kutscher et al. to Renard would select an evaporator having a wider fm spacing and no higher pressure drop than the original Renard evaporator, which would not improve air flow uniformity". The Examiner appreciate that the Applicant at length acknowledge that Kutcher et al., recognize that means disclose a higher fin density heat exchanger will characteristically exibit a higher air-side pressure drop relative to a lower fin density heat exchanger. However, The Examiner disagrees the argument for not teaching the claimed invention. The constructional feature of the invention is related with higher fin density evaporator/heat exchanger and teaching is higher air-side pressure drop. Both the constructional feature and the legitimate teaching of higher air-side pressure drop are provided by Kutcher et al. Now the Applicant asking for further motivation for problem of frost formation and build-up between closely spaced fins. Primarily The examiner does not find any reason to find a motivation against frost formation and build up between closely spaced fins because is not the claimed subject matter. Secondly, any heat exchanger may not be concerned with frost formation unless it is an evaporator. The Examiner perceives that The Applicant avoids to deny directly that the Kutcher's et al., heat exchanger is not an

evaporator and so it is not related with frost formation. In this regard The Examiner likes to mention that if a heat exchanger is used as an evaporator it will automatically address the problem of frost formation. Therefore, if the Kutcher's heat exchanger is used as an evaporator it will address the problem of the frost formation and build up between the fins inherently as it meets the constructional feature of higher fin density and having higher air-side pressure drop. It is also mentioned that a heat exchanger can be used as an evaporator or condenser for an air conditioner(refrigeration) circuit, a radiator or a heater core for a vehicle, or other type heat exchanger. (See column 1, lines 10-12 of US Patent No. 5,214,847 to Akoi). Therefore, there is no problem to use Kutcher's et al., heat exchanger as an evaporator to meet obviously the claimed invention. Therefore, the rejections are ok.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad M. Ali whose telephone number is 571-272-4806. The examiner can normally be reached on maxiflex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J. Tyler can be reached on 571-272-4808. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Md. Mohsin Ali

MOHAMMAD M. ALI
PRIMARY EXAMINER